

## DOCUMENT RESUME

ED 452 808

IR 020 616

AUTHOR Lyon, Elizabeth  
TITLE PATRON: Using a Multimedia Digital Library for Learning and Teaching in the Performing Arts.  
PUB DATE 2000-10-00  
NOTE 12p.; In: EDUCAUSE 2000: Thinking IT Through. Proceedings and Post-Conference Materials (Nashville, TN, October 10-13, 2000); see IR 020 605. Figures may not reproduce adequately.  
AVAILABLE FROM For full text:  
<http://www.educause.edu/conference/e2000/proceedings.html>.  
For full text:  
<http://www.educause.edu/asp/doclib/abstract.asp?ID=EDU0026.html>.  
PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)  
EDRS PRICE MF01/PC01 Plus Postage.  
DESCRIPTORS Computer Assisted Instruction; \*Educational Resources; \*Electronic Libraries; Foreign Countries; Higher Education; Material Development; \*Multimedia Materials; Nonprint Media; Online Systems; Theater Arts  
IDENTIFIERS University of Bath (England)

## ABSTRACT

The creation and application of a multimedia digital library to support learning and teaching in the performing arts is described. PATRON (Performing Arts Teaching Resources Online) delivers audio, video, music scores, dance notation, and theater scripts to the desktop via an innovative Web-based interface. Digital objects are linked subjectively by users in profiles with different formats and functions, for example, e-notebook, multimedia essay, and synchronized timeline. Metadata are implemented in XML and extended Dublin Core. Rights issues related to digitizing multimedia resources are noted and the watermarking of audio and video images is described in relation to rights protection. Two figures show the PATRON interface and a contextual profile. (Author/AEF)

**PATRON: Using a Multimedia Digital Library for Learning and Teaching in  
the Performing Arts**

**Elizabeth Lyon**

**Director, UK Office for Library & Information Networking (UKOLN)  
University of Bath  
UK**

**Abstract**

The creation and application of a multimedia digital library to support learning and teaching in the Performing Arts is described. PATRON Performing Arts Teaching Resources Online delivers audio, video, music scores, dance notation and theatre scripts to the desktop via an innovative web-based interface. Digital objects are linked subjectively by users in profiles with different formats and functions, for example, e-notebook, multimedia essay, and synchronised timeline. Metadata are implemented in XML and extended Dublin Core. Rights issues related to digitising multimedia resources are noted and the watermarking of audio, video and images is described in relation to rights protection.

PERMISSION TO REPRODUCE AND  
DISSEMINATE THIS MATERIAL HAS  
BEEN GRANTED BY

**C.J. Keller**

TO THE EDUCATIONAL RESOURCES  
INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION  
Office of Educational Research and Improvement  
EDUCATIONAL RESOURCES INFORMATION  
CENTER (ERIC)

This document has been reproduced as  
received from the person or organization  
originating it.

Minor changes have been made to  
improve reproduction quality.

Points of view or opinions stated in this  
document do not necessarily represent  
official OERI position or policy.

2

2

**BEST COPY AVAILABLE**

## Introduction

We have designed and created a digital library of performing arts materials for the on-demand delivery of digital video, dance notation, audio, music scores, and theatre scripts across a high speed ATM network to the desktop. The work began in 1996 as the PATRON Performing Arts Teaching Resources ONLINE project (<http://www.lib.surrey.ac.uk/Patron/Patron.htm>) which was initially funded through the UK Higher Education Funding Councils' JISC eLib Programme. The University of Surrey, UK, has supported the follow-on project PATRON2 (<http://www.lib.surrey.ac.uk/Patron2/>) which explored embedding the system within the academic curriculum, and a full operational multimedia digital library service is now being implemented. The potential for the system to provide a contextual learning environment was envisaged at an early stage and this aspect has been developed through the use of "profiles" which are described in more detail below. In parallel, a JISC Technology Applications Programme funded investigation of the role of digital watermarking of multimedia materials PatronMark (<http://www.lib.surrey.ac.uk/patronmark/>), is presented in the context of rights protection.

## A Learning and Teaching Approach

The Library-based technical development team worked in partnership with staff and students from the School of Performing Arts (dance, music, and theatre), from the start and their contributions and feedback have been critical to the success of the service. One of the original project aims was to improve access to reserve or short-loan materials such as videos and CDs, and more specific user requirements were investigated via a series of initial focus groups which informed the design of the PATRON interface. Staff and students were invited to comment on the beta version and on subsequent developments, and they have since conducted an evaluation of the working system. Modifications were made as a result of this evaluation; external evaluation was also carried out by professionals in music, dance and theatre and many useful suggestions were made through this process. User feedback has been very good overall and some user quotes are given below:

*"useful because it pulls together all the resources for one course especially where hard copy might be limited"*

*"it's like having a music library in your own room"*

PATRON works at two levels: firstly as a digital library delivering resources on-demand to the user and secondly as a contextual environment. We have developed a number of tools for using the multimedia materials to enhance and enable their application by the students and staff on the different courses. These tools have developed from the concept of a "profile" and in most cases, the tools have been created in response to a specific request from a member of the academic staff in the School. The different applications are explained in more depth in the Profiles section.

From the outset, materials for digitisation were identified from selected undergraduate and postgraduate courses in Music including *Repertoire Studies*, *Style History*, *General Repertoire Knowledge*, *Twentieth Century Analysis*,

*Orchestration, Renaissance Studies and The Mature Classical Symphony; and in Dance, Critical Perspectives, Movement Analysis, UK Theatre Dance and Analysis and Criticism.*

Three specific types of media have been digitised: binary images, audio and video. There is also some text. The images, namely dance notation and music scores, have created particularly demanding conversion problems e.g. originals vary in quality and size, dance notation is often hand-drawn and can be faint, music scores may be reprints so the resolution and contrast can be poor and the application demands that images display quickly, so files must be small but include sufficient detail to enlarge without a loss of quality. These problems have corresponding rights issues which are briefly mentioned in the next section on Rights Clearance.

### **Rights Clearance**

The original project was viewed as a test-bed opportunity for rights holders and licensing organisations in the UK to participate in an innovative experiment to employ digital multimedia materials for learning and teaching in higher education. The approach taken by the project team was one of forging partnerships with the relevant organisations (e.g. Music Publishers Association, Music Alliance) since in order to make digital copies of materials in the UK, permissions have to be obtained from the rights holders. This process has been described in detail in an earlier paper<sup>1</sup>. Rights clearance have been obtained for all materials used in the digital library and an administrative database maintained. We were unable to obtain permissions to use certain works and others had to be substituted – this is not an ideal situation as in some cases specific interpretations of a particular work were required by the teaching staff. It was generally more difficult to identify rights holders and obtain clearance for video material.

Some interesting moral rights issues have been raised: dancers are very concerned with the quality of digitised materials and may not be happy if the images are of poor quality through the file compression process. They may also be concerned at the potential for manipulating their performance once a digital copy is made. The concept of a performance versus a recording is a sensitive area: the performance being an individual and unique work of art in itself. Some artistes do not support the concept of recorded work for aesthetic reasons and may refuse to allow digital copying on those grounds. Where performance is an integral part of the academic curriculum, this may provide problems for the creation of digital libraries to support learning and teaching.

Although software programmes have been developed to create electronic notation e.g. LabanWriter, there is still much that is hand-written. There are moral rights associated with digitisation of hand-written notation: many of the marks are very small and the quality of digitised (scanned) material may be inferior and open to misinterpretation.

### **Rights Protection**

There are a variety of technologies that can be employed to act as deterrents to infringements of rights associated with digital assets, such as encryption and

digital signatures involving the use of public and private keys. The PatronMark project investigated the use of both visible and indiscernible watermarking of multimedia materials for authentication and audit purposes. A range of watermarking products were evaluated for use with video, audio and binary images: their robustness, audibility and ease-of-use was examined. A series of demonstrators were set up to watermark PATRON materials on-the-fly in an operational production environment; the effect of watermark content on the effectiveness of the process was tested and the ability of users to interfere with the process was monitored. Results are presented at <http://www.lib.surrey.ac.uk/patronmark/Indexpm.htm>. Although some recommendations were made for marking audio and video, the performance of products for marking images was generally disappointing. In response, a new cross-platform tool implemented as a Java servlet, has been developed which marks images at high speed on-the-fly from a web server. The watermark consists of graphic and textual data which in the prototype are keyed in, and time data which are taken from the server. The program is written so that a plug-in accepts information from other sources, such as session user names and from metadata sources on the server: options include position, image scale and boldness or density. The code has been optimised for speed. Program documentation is available separately, and the servlet is available for evaluation by interested organisations. The Final Report of the project will shortly be available at <http://www.itap.ac.uk/>.

### **Metadata Standards and Interoperability**

From the outset, PATRON has been developed with an open architecture and to comply with international standards and formats in order to promote interoperability with other systems and browsers. The metadata in PATRON have been implemented in XML based on Dublin Core with extensions which include pointers to time subdivisions, temporal and spatial data types. As a result, a high degree of granularity has been achieved which has facilitated the development of a variety of profile tools which fully exploit the multimedia resources. High level metadata include pointers to distributed resources which may also be embedded within profiles. A generic tool has been developed to automate the generation of metadata in the PATRON schema.

### **The PATRON System**

The digitisation procedures have used a degree of compression which is a balance between achieving acceptable quality and limited file size. Notation and scores were scanned and saved in .gif format with adjustments via Adobe Photoshop for quality. Audio is stored as MPEG 1 Layer 3 whilst video conversion is to MPEG 1. More details of the digitisation procedures are given in an earlier article<sup>2</sup> and more general information is given elsewhere<sup>3,4,5</sup>. It was essential to guarantee delivery of data across the network in order to maintain the quality of the audio and video and ATM hardware was supplied by K-Net. Technical details of the system hardware and software have been listed previously<sup>6,7</sup>; Data conversion and interface development were completed locally.

The PATRON user interface works within a web browser. The design allows the application to be implemented flexibly, with a simply managed layout consisting

of a large frame which is primarily designed to cope with vertical pages of notation, and smaller frames for video and audio playing, searching and other activities. Any of these frames can be switched to the larger frame. It is also possible to display two large frames side-by-side e.g. to compare two dance videos or music scores. One of the frames includes a history of the current session with links to previous frames. The PATRON interface is shown in Appendix 1 Figure 1.

The controls for playing video and audio are essentially the same as those on a video or CD player and will be familiar to users. Users can view and listen, move backwards and forwards, change speed, and make selections which can be played repeatedly. In the case of music scores and dance notation it is necessary to cope with a variety of sizes, so the user can zoom in and out, pan around the image and move to the next or previous page by a mouse click or a single key. Users who are watching a dance video or listening to audio and simultaneously following the corresponding notation or score can therefore turn the page rapidly with a single mouse click. To provide direct access to a specific movement, act or page, each work is accompanied by a table of contents which has a cascading hierarchy of hyperlinks which are equivalent to the structural sections of the work and can take the user to a particular page or specific time in a recording track.

### **Profiles**

Whilst some users are simply retrieving listening or viewing course works on demand from workstations in the Library, others are exploring the more creative tools available e.g. profiles. The creation of individual profiles is a unique feature of PATRON: a profile is an annotated list of dynamic links to selected points or sections within a digital resource e.g. a video segment of an opera associated with corresponding pages of music score.

The PATRON profile enables the user to link different media or to mark related elements in the same work and these links can be annotated. The profile provides the student with an electronic framework for constructing a subjective analysis of a music or dance or theatre performance which may contribute to the course work submitted for assessment. A desired link is achieved by the user dragging the cursor on screen at the precise time in a recording or page of a score, to the profile which then develops through the addition of free-text notes and the creation of further annotated links.

The profile remains an open document with links to URLs, it conforms to HTML standards and can be subsequently read in any web browser. The PATRON interface and profiles exploit some of the technical features available in the latest browsers, specifically Microsoft Internet Explorer 5.0, and a combination of ActiveX controls has been used in the players together with Dynamic HTML and JavaScripts.

Profiles can be used in a number of different ways. Links can be made to external URLs such as text from electronic journal articles and to subject-related web sites. In addition, a selection of random links to "clips" from selected video, audio or notation/scores can be saved to a program script within a profile and the program then plays the clips sequentially: we have called this feature

"RadioPatron". It is being implemented by academic staff in Performing Arts who create a profile using this feature, that contains pointers to chosen videos or digital audio tracks from a particular course e.g. Repertoire Studies. The profile is then played and used by the students as a learning tool for recognising set works/themes/movements and a rudimentary self-assessment mechanism is in place.

In another variant of the profile, a synchronised timeline for a work can be created and several formats have been developed progressively:

- a basic timeline whose length represents the length/timespan of the item; events such as a page of a score or a photograph can be dropped onto the timeline at selected times and annotations can be added
- synchronised playing back of the time-based material with the events. Typically this enables the pages of a score to turn automatically as a recording plays.

The synchronised timeline currently requires a creation stage where the expert user turns the pages of a score while the music plays. This event is automatically entered into the profile. On playback, three points of synchronisation are available: linear-based, event-based and timeline-based. These have all been used in trials and found to be valuable tools by academic staff, for example, this feature has been exploited by staff and students working on choreography where precise timing within dance works is crucial for study and analysis.

Other applications of profiles include use as a cueing list of "clips" for display or demonstration within a lecture or seminar, and as a means of creating a "master" critical analysis of a particular set work by a tutor for discussion with students.

At its simplest, the profile can be used as an electronic notebook; at its most complex it can be used to create a rich contextual learning environment and an example of this is given in Appendix 2 Figure 2.

In this screen shot there is a frame displaying text from a chapter of a book on gender and the role of women with links to other sites. This is supported by two videos which are triggered from the lower left frame with some additional script relating to the work.

### **The PATRON Service**

The service is managed and developed by staff within the Centre for Learning Developments ([www.surrey.ac.uk/CLD](http://www.surrey.ac.uk/CLD)) which is a new organisation within Information Services bringing together strategic initiatives related to learning and teaching which are often (but not always), based on emerging technologies. Ways of streamlining the PATRON service are being considered including automating the creation of metadata. To this end, a tool has been devised which takes bibliographic details of a digital resource input via a web form and automatically generates standard Dublin Core metadata for storage in a database. This is a generic tool which has recently been used in another project to generate DC metadata from bibliographic details of university exam papers to enable students to access them on-demand from a web server.

The integration of the PATRON digital library with a virtual learning environment, Lotus LearningSpace has also been investigated. LearningSpace is currently used to deliver a range of online courses at the University of Surrey. Demonstrators have been created which facilitate access to PATRON resources from within LearningSpace, both with a basic toolset and with the full PATRON application.

### Issues for the Future

We believe there is much scope for the further development of PATRON and in particular in the following areas:

- The implementation of new applications of profiles to facilitate additional learning and teaching scenarios
- Tools for managing the creation, manipulation and conversion of metadata including the maintenance of authority lists (work on this latter aspect has already begun)
- Integration of new rights management tools and technologies
- In depth pedagogical evaluation of the use of PATRON

PATRON is also been used in other subject domains and some interesting work has been carried out in developing the application in the area of dietetics using video footage of "patients and clinical staff", "case notes", nutritional information and expert textual interpretation to facilitate interactive learning and teaching programmes for undergraduates in this discipline. The synchronised timeline profile has been utilised and developed further in this project.

### References

1. Lyon, Elizabeth and Maslin, J. (1997). Audio and video on-demand for the performing arts: Project PATRON. *International Journal of Electronic Library Research*, Vol 1 (2), 119-131.
2. Maslin J. & Lyon, E. Project Patron: exploiting a digital library for the performing arts. *IEEE Euromicro 99 Proceedings*, pp35-41. Milan, Italy, September, 8th-10th, 1999
3. Lyon, Elizabeth (1998). Face the Music and Dance. *Ariadne* Issue 15, 1.
4. Maslin J & Lyon Elizabeth (1998) Project Patron - Audio and video on demand at the University of Surrey. *Journal of Academic Librarianship*, 24, 464-8.
5. Maslin, J and Lyon Elizabeth (1998). Project PATRON - audio and video on demand at the University of Surrey. *Information Services & Use*, 18, 45-51.
6. Lyon Elizabeth, (1999) *Proceedings International Dance and Technology Conference*, pp 45-47, February 1999, Arizona State University, USA.
7. Maslin, J. and Lyon Elizabeth (1999) Project Patron: a digital library for the Performing Arts. *Digital Resources in the Humanities Conference*, pp6-8, September 1999 London.

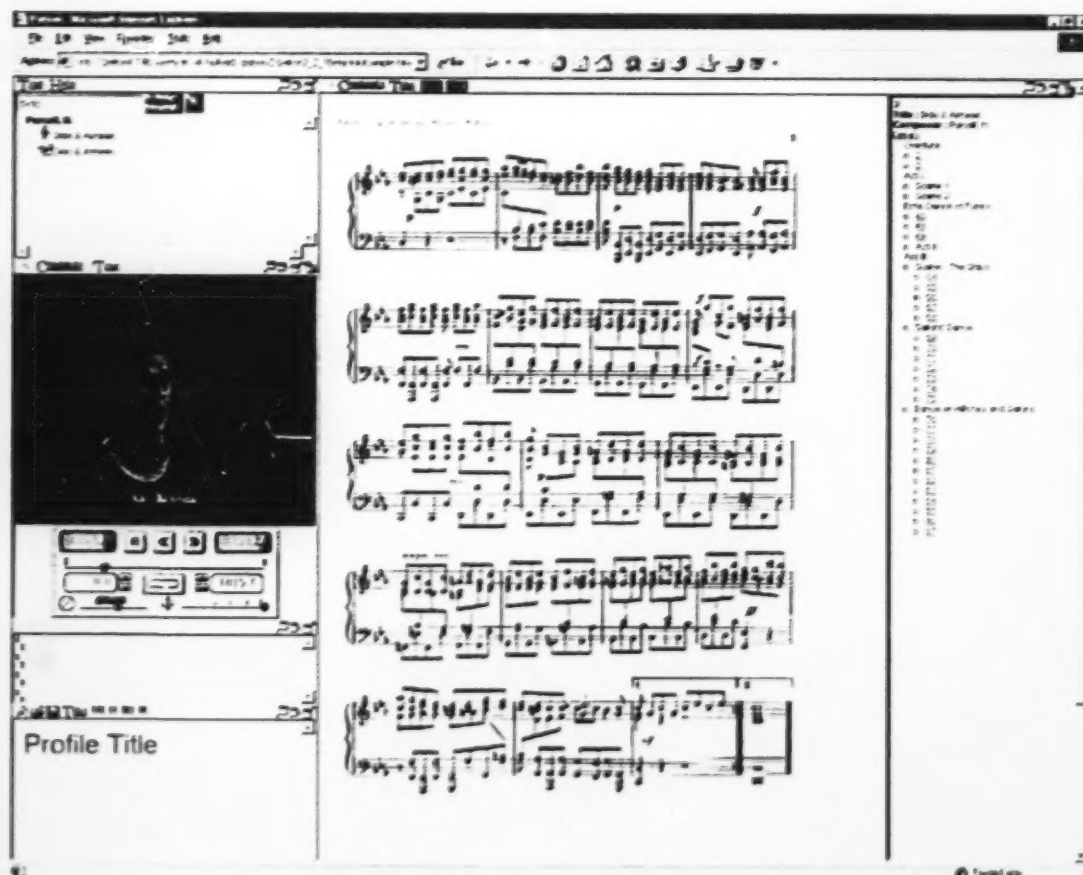
### Contact Details

For more information about PATRON or PatronMark please contact:

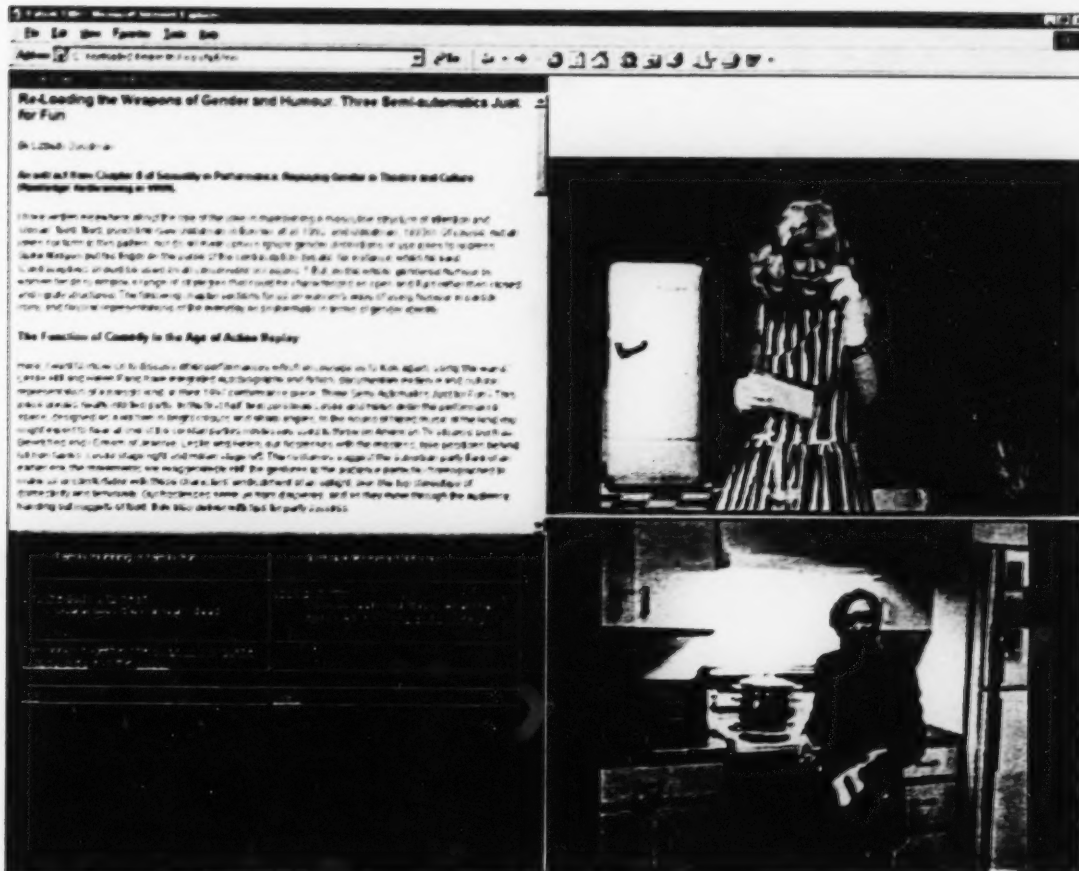
Jon Maslin  
Centre for Learning Developments  
George Edwards Library  
University of Surrey  
Guildford GU2 7XH  
UK

Email: [j.maslin@surrey.ac.uk](mailto:j.maslin@surrey.ac.uk)

## Appendix 1 Figure 1 The PATRON Interface



## Appendix 2 Figure 2 A Contextual Profile



### Copyright Notice

This paper was presented at EDUCAUSE 2000 in Nashville, October 10-13, 2000. It is the intellectual property of the author(s). Permission to print or disseminate all or part of this material is granted provided that the copies are not made or distributed for commercial advantage and the title and author(s) of the paper appear. To copy or disseminate otherwise, or to republish in any form, requires written permission from the author(s).



EDUCAUSE

**Information Resources Library**

Transforming Education Through Information Technologies

## Abstract

**Category:** Papers Presented at EDUCAUSE annual conferences

---

**ID Number:** EDU0026

**Title:** PATRON: Using a Multimedia Digital Library for Learning and Teaching in the Performing Arts

**Author:** Elizabeth Lyon

**Organization:** University of Bath

**Year:** 2000

**Abstract:** The creation and application of a multimedia digital library to support learning and teaching in the Performing Arts is described. PATRON Performing Arts Teaching Resources ONline delivers audio, video, music scores, dance notation and theatre scripts to the desktop via an innovative web-based interface. Digital objects are linked subjectively by users in profiles with different formats and functions, for example, e-notebook, multimedia essay, and synchronised timeline. Metadata are implemented in XML and extended Dublin Core. Rights issues related to digitising multimedia resources are noted and the watermarking of audio, video and images is described in relation to rights protection.

**This material is available in the following electronic formats:**



Select one of the icons above to retrieve the material in that format. We also have [definitions and instructions](#) for setting up your computer to download these formats.

---

[Home](#) | [Feedback](#) | [Search](#) | [Copyright](#)